

LBNL SAFETY REVIEW COMMITTEE

**Triennial Review of the
Management of Environment, Safety, and Health**

Life Sciences Division

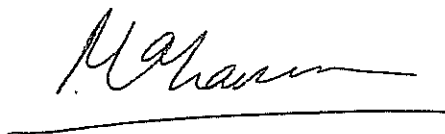
August 2007



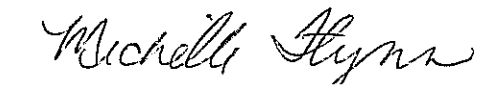
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**Triennial Review of the Life Sciences Division
Management of Environment, Safety, and Health (MESH)**

August 2007

A. Executive Summary

The Life Sciences Division (LSD) has a well established Environment, Safety and Health (ES&H) program to manage safety in its work activities and operations. Division Management has stabilized over the last two years and demonstrates a strong commitment to ES&H. LSD has a good safety record, in spite of a geographically dispersed workforce, large student population, and a broad range of hazards present in the Division's activities.

Since its last MESH review in 2005, Life Sciences Division made several improvements to ensure it maintains a robust system for implementing Integrated Safety Management (ISM). The Division committed resources (0.5 FTE) for a Deputy Safety Coordinator position to ensure depth in this critical function. LSD began funding a portion of certain building managers' effort, and increased their responsibility for building safety issues. The Division improved its efforts to address ergonomic hazards with increased communication and funding of equipment replacements. To enhance safety communications throughout LSD, the Division added the Division Safety Coordinator to the Life Sciences Director's Advisory Committee (LSDAC) and safety is a standing agenda item.

This Life Sciences Division review notes 4 noteworthy practices, 7 observations and 3 concerns. Opportunities for improvement include the Division-specific Job Hazard Questionnaire and ES&H training, and reinforcement of safety policies. Concerns identified during LSD's 2005 MESH, in some cases, are unresolved.

B. Description of Division

The Life Sciences Division has an annual budget of approximately \$50 million and approximately 550 employees and guests. Most of the Division's research is performed by small research groups under the direction of a principal investigator. These groups are organized into eight departments: Cancer and Systems Biology, Cell Biology and Imaging, Genome Stability, Genome and Computational Biology, Medical Imaging Technology, Molecular Imaging and Neurosciences, Radiation Biosciences, and Structural Biology and GTL (Genomes to Life). LSD solely occupies buildings 55, 55A, 56, 83 (under renovation) and 74, and partially occupies buildings 1 (Donner), 64, 70A, 73, 84 and 977 (Potter Street). Some of the buildings occupied by LSD are scheduled for major renovation to correct seismically poor conditions and modernize the facilities.

Division personnel conduct research in cancer biology, molecular and nuclear medicine, radiation biology, DNA repair, subcellular structures, and genomics. They use a broad range of generally low-risk scientific devices and instruments including gel electrophoresis systems,

scintillation counters, centrifuges, light and electron microscopes, and cell culture incubators. Relatively higher risk devices such as Class 2B and 4 lasers, the cobalt-60 source and the Biomedical Isotope Facility and use of hazards chemicals, radioactive material, and biological agents are covered by formal authorizations.

The Life Sciences Division Safety Committee (LSDSC) is comprised of a member of each research group along with the Division Safety Coordinators, EH&S Division Liaison, and administrative support. Three members of the Genomics Division research programs housed in building 84 (Genomics West) also participate in the LSDSC. Safety is a standing agenda item on the Life Sciences Director's Advisory Committee (LSDAC).

C. Description of the Appraisal Process

The objective of the MESH Review is to evaluate the Life Sciences Division's management of ES&H in its research and operations, focusing on the implementation and effectiveness of the Division's Integrated Safety Management (ISM) Plan. The MESH is a peer review that provides perspective from the research and operations community on the state of ES&H in the Division. The review team consisted of Paul Blodgett, team leader from Environment, Health and Safety Division; Carl Cork, Physical Biosciences Division; Pilar Francino Puget, Genomics Division; and Michelle Flynn, Office of Contract Assurance.

The appraisal process included a review of the documentation provided by Life Sciences Division and the Office of Contract Assurance: LSD's response to the MESH questionnaire and supporting documentation, Division ISM Plan, list of formal authorizations, Corrective Action Tracking System (CATS) records, agendas and minutes from safety meetings, and accident and injury data.

The MESH Team conducted an opening meeting with Division representatives, interviewed senior and line management and staff, and visited division workspaces. At the opening meeting, Deputy Director for Operations Rebecca Rishell, and Division Safety Coordinators Tony Linard and Scott Taylor discussed the Division's safety program with the team. In addition to these individuals, the team interviewed Division Director Joe Gray, Ken Downing, David Knowles, David Larson, Chuck Sindelar, Pradeep Nair, Chris Ramsey and James O'Neil. The team inspected spaces in Donner Lab, Potter Street, and Buildings 56, 64, 74, and 84.

D. Results of the MESH Appraisal

The appraisal results are organized by the five core functions of Integrated Safety Management. Findings are broken into three categories: concerns, observations, and noteworthy practices. Concerns are clear cases of practices or conditions that do not comply with regulations or LBNL policy, and/or indicate inadequate ES&H management systems within the Division. Concerns are deficiencies and must be corrected. Observations indicate room for improvement. They may be practices or conditions that are not necessarily out of compliance, but could lead to non-compliance if unaddressed. Noteworthy practices are practices and conditions that are recognized for their excellence and should be considered for lab-wide application. All findings are based on documentation review, interviews with division staff, and workspace inspections.

1. Work Planning

Life Sciences Division is comprised of eight departments, with researchers grouped by research interest. Each Department Head has line management responsibility for all principal investigators (PIs) within their department. The PIs designate work leads to oversee their operations, usually specified by location.

The Life Sciences Division Safety Committee (LSDSC) is comprised of a member of each research group along with the Division Safety Coordinator, Division Deputy Safety Coordinator (current Safety Review Committee representative), EH&S Division Liaison, and administrative support. Three members of the Genomics Division research programs housed in building 84 (Genomics West) also participate in the LSDSC. LSD provides safety management for Genomics West programs at the request of and on the behalf of the Genomics Division Director. Safety is a standing agenda item on the Life Sciences Director's Advisory Committee (LSDAC), which includes the Deputy Division Directors, Department Heads, Division Safety Coordinator, and senior members of the Division.

1.1 2007 MESH Results

Observation: Students are not explicitly mentioned in the staff accountability section of the ISM plan, even though LSD management recognizes students as their greatest vulnerability in implementing ISM. This was a finding of the 2005 MESH and noted as an opportunity for improvement in the performance year 2006 LSD self-assessment validation report. The LSD ISM plan does address supervisors' responsibility for ensuring proper safety training for students.

Observation: Additional training for the building managers on mitigation of safety related issues would be useful. Building managers in major LSD buildings (Donner, 55/64, 74, 84 and Potter) are paid by the Division to support the division Self-Assessment program. The building managers are tasked with monitoring changes in hazards within their buildings and supporting weekly building walkthrough inspections with the Division Safety Coordinator and/or Deputy Division Safety Coordinator. Two of the building managers interviewed did not recognize that they need to take action on safety related issues, i.e., permitting bicycles in a building hallway and a cabinet impeding egress from a room. Furthermore, while the Division expanded the safety role for these individuals almost 2 years ago, they have not updated their position descriptions to reflect this.

Observation: Communication of ES&H issues needs improvement. LSDSC meets only when there is sufficient new material to present, as deemed appropriate by the Division Safety Coordinator, and as warranted by the Division's safety performance. Last year the committee met only four times, on average attendance was less than 75%, meetings typically last less than one hour, and there was no meeting between October 2006 and March 2007. Based on the LSDSC meeting minutes, ES&H compliance is often a topic of discussion. To instill and maintain safe and compliant work habits, Division staff may benefit from more frequent

meetings and dissemination of information. Periodically polling PIs and work leads for safety issues of concern may expand meeting topics and improve attendance.

Noteworthy Practice: Following its LSDSC meetings, the Division summarizes current ES&H issues and formats the information into a Life Sciences Division Safety Bulletin. Bulletins are posted in common areas for LSD staff to read. The Division should explore additional avenues to promote readership.

Noteworthy Practice: The Division has committed resources for a Deputy Division Safety Coordinator position to assist with the implementation of ISM. This individual also serves as the LSD representative to the Safety Review Committee.

1.2 Corrective Action Status – 2005 MESH

2005 MESH Concern: *As a follow-up to the incident involving an untrained and unsupervised student contaminated with radioactive material, then Lab Director Shank directed all LBNL divisions to address student safety in their ISM plans. The current version of the Life Science's ISM plan does not specifically address student safety. Given that the division has a large student population and that the incident occurred with a student in LSD space (Donner Lab), the Division should be more explicit in their plans for student safety.*

2007 Status: LSD partially addressed this concern by amending its ISM plan to address supervisors' responsibility for ensuring proper safety training for students; however, the plan does not explicitly mention students in the staff accountability section. See 2007 MESH review Observation in Section 1.1.

2005 MESH Concern: *The last MESH review of LSD in 2001 observed that the division should consider additional resources to support its ES&H program. Since that review, although the Division has expanded both in terms of funding and space, it has not planned for additional resources for its ES&H program. Because the Division relies so heavily on the Division Safety Coordinator, who also has other non-ES&H duties and responsibilities, Division management should provide back-up for the Coordinator in case of his absence from work, and should consider re-allocating some of the Coordinator's responsibilities to other staff. Increased sharing of ES&H responsibilities with others will also enhance the Division's Integrated Safety Management.*

2007 Status: LSD has taken positive steps to address this concern, including the recent addition of a Deputy Division Safety Coordinator (0.5 FTE) to assist the Division Safety Coordinator. Following the 2005 MESH review, LSD began funding a portion of building manager support in major LSD buildings (Donner, 55/64, 74, 84 and Potter) in return for their Division Safety Coordinator-directed involvement in building safety issues. One of their tasks is to monitor changes in hazards within their buildings, as well as support weekly building walkthrough inspections with the Division Safety Coordinator. Designating a building occupant as building manager for Donner also addressed a 2005 MESH review observation that the Division Safety Coordinator, whose office was in Building 74, was the Building Manager for 74, 84, and Donner.

While these are positive developments, issues remain with implementation. See 2007 MESH Observation in Section 1.1.

2. Hazard Identification and Risk Analysis

Life Sciences Division staff contend with hazards from the use of x-rays, hazardous chemicals and wastes, lasers, risk group 2 biological organisms including bloodborne pathogens and one Center for Disease Control (CDC) select agent. The Division faces ergonomic hazards unique to laboratory settings, in addition to those present in an office environment.

Life Sciences Division uses the Division Safety Coordinator's NEPA/CEQA review of grant proposals as its initial identification of hazards. The Division then uses input from the JHQ, training records, annual Space Hazard database updates and safety walkthroughs of spaces to corroborate information provided during the NEPA/CEQA review. Building managers in LSD's major buildings monitor changes in hazards within their buildings and support building walkthroughs by the Division Safety Coordinator and/or his deputy. The Division maintains its inventory of hazards in its Space Hazard database.

2.1 2007 MESH Results

Observation: LSD maintains its own Space Hazard Database, similar to the Lab's institutional Hazard, Equipment, Authorization, Review (HEAR) System. This includes very useful information for hazard identification and risk assessment. However, this information is not readily available to all stakeholders. LBNL has an institutional need to account for all the hazards at the Lab. This is accomplished by using the HEAR system. The HEAR system is currently being updated and scheduled for release at the end of the calendar year. LSD plans to try the new institutional database once it is available and determine if it meets the Division's needs. LSD should work with the HEAR committee to ensure that their needs/requirements are included in the latest version of HEAR so that they can document and account for their hazards institutionally.

Observation: Overcrowding was recognized as a problem in some of the buildings. This is a significant challenge for the Division. Current efforts to reduce clutter and provide appropriate storage do not appear to be especially effective.

Noteworthy Practice: LSD increased awareness of ergonomic issues and allocated almost \$90K for ergonomic equipment in FY 2007. The MESH team heard positive feedback from employees on recently procured electric pipettors. The Division is in the early stages of addressing ergonomics at microscope user stations. They are also investigating high-throughput robotics to reduce repetitive stress injuries.

2.2 Corrective Action Status – 2005 MESH

2005 MESH Concern: *Although the Division had only one ergonomic-related injury this current fiscal year, ergonomics still remain a key issue. The Lab, as a whole, has emphasized*

workstation evaluations and the replacement of old furniture with ergo-featured furniture as a way of preventing ergonomic injuries. Life Sciences participated several years ago in a matching fund initiative to replace their old workstation furniture. However, the Division could not provide evidence that this effort was sustained. For example, according to the ERGO database, in FY05, only six (6) workstation evaluations were conducted. In the previous year, there were nine (9) evaluations. Given that the division has approximately 580 employees and guests who come and go on a regular basis in multiple locations, the number of ergonomic evaluations appears to be inordinately low. The MESH inspection further supported this viewpoint; the team noted a significant number of work areas where an ergo evaluation and replacement of old furniture were warranted.

2007 Status: The Division developed an ergonomics awareness program that consists of enhancing communications about ergonomics, making evaluations available to all personnel, replacing old furniture, modifying office and laboratory workstations, and on-going intervention with the EH&S ergonomic specialists. LSD currently has 3 trained ergo advocates and the Division's goal is to train the majority of its administrative staff. Division management acknowledges the lingering reluctance on the part of staff to report ergonomic discomfort. They are working to assure staff that reporting discomfort and requesting equipment will not impair the Division's research.

3. Establishment of Controls

Life Sciences Division has identified hazards common to almost all division employees. Most of these hazards fall below the formal authorization level and LSD uses its new employee orientation program to train staff to work with these low-level hazards.

Research activities in LSD requiring formal authorization are covered under the following: Activity Hazard Documents (AHDs, including lasers), Biological Use Authorizations (BUAs), Radiological Work Authorizations (RWAs), Sealed Source Authorizations (SSAs) and X-ray Authorizations. In addition to EH&S Division oversight of formally authorized work, LSD compares information from JHQs, training records, and Space Hazard database to ensure the proper authorizations and training are in place.

LSD is participating in the new Job Hazards Analysis (JHA) program pilot and will use this new work authorization process in 2008 to identify and control hazards below the level of a formal authorization.

3.1 2007 MESH Results

Concern: LSD has established its own Division-specific Job Hazards Questionnaire (JHQ). Over time, it has diverged from the Lab's institutional JHQ and LSD is working with EH&S to resolve the differences. LSD should either implement a process to ensure their applicable JHQ questions are the same as the institutional JHQ or adopt the institutional JHQ. This will be especially vital once the JHA is implemented since the JHQ will be one component of the JHA.

Concern: The tailored version of new employee orientation that LSD provides for all new hires and guests is presented via video tapes of select EH&S courses which were recorded in the mid 1990's. These courses are not in accord with the institutional courses that are offered by EH&S. LSD is working with EH&S Training to obtain more up-to-date materials and is developing a web-based presentation format. In the interim, LSD should work with EH&S Training to ensure that credit given for EHS courses represent information provided in the institutional courses.

Noteworthy Practice: The new employee orientation program is a good mechanism for ensuring a common safety foundation. This enables the Division to focus on LSD-specific issues and to encourage safety discussions among Division employees. New employees also meet the Division Safety Coordinator. Furthermore, LSD is working with the EH&S Division to develop a division-specific ESH 010 Introduction to Safety class.

3.2 Corrective Action Status – 2005 MESH

The 2005 MESH noted 2 concerns under Establishment of Controls. These are addressed in this report under Feedback and Improvement, Section 5.2.

4. Work Performance

The Life Sciences Division incurred 3 recordable injuries in the past year, 2 ergonomic and one resulting from a slip. The Division investigated the incidents with the appropriate rigor and took corrective action. LSD received a Nonconformance Corrective Action Report (NCAR) for waste stored over one year in a Satellite Accumulation Area (SAA) and a waste sampling QA exception report. The Division received one Level-2 RWA violation during the past year, an improvement over the previous year.

4.1 2007 MESH Results

Concern: The MESH team observed several lapses in safety practices, including an employee working in Building 84 in a Biosafety Level (BSL) 2 lab not wearing a lab coat while handling Risk Group (RG) 1 biological material. LSD should review its safety communications to address this weakness. Retraining or refresher courses may be appropriate.

Observation: During the walkthrough of the Donner Lab, the MESH team visited a vacated lab where dry chemicals and biological materials remained. LSD is in contact with the PI previously in charge of the lab and the Division has hired a student to assist in the preparation for disposal of the remaining chemicals, all of which are in the manufacturers' packaging and labeled. The Division ISM Plan indicates that PI and laboratory managers are to advise the Division Safety Coordinator of plans to vacate space or relocate operations no less than two months in advance of such action to allow time for removal of radioactive and/or hazardous chemical materials. Prior to the PI's departure, he did coordinate with the Radiation Protection Group to remove all radiological materials and decommission an X-ray irradiator. However, it appears that much of the remaining cleanup effort did not begin until after the PI's departure. This is an area that could use some improvement.

4.2 Corrective Action Status – 2005 MESH

There were no Concerns noted in the 2005 MESH under Work Performance.

5. Feedback and Improvement

The Division Safety Coordinator engages Life Sciences Division line managers and building managers in safety walkthroughs and participation is documented in the Division's log of inspections. Supervisors and the Division Safety Coordinator perform a detailed walkthrough of spaces to identify hazards during the annual LSD Space Hazard database update.

5.1 2007 MESH Results

Observation: Though the Life Sciences Division's use of the CATS database has improved, the Division is not using the Facilities Work Request Center function of CATS for safety deficiencies requiring Facilities attention.

5.2 Corrective Action Status – 2005 MESH

The following three 2005 MESH concerns involve safety conditions at Donner Lab:

2005 MESH Concern: *During the MESH inspection, the MESH team noted numerous instances of seismically unsecured equipment and storage furniture. In particular, the Donner Laboratory facility (Building 1) was generally lacking in seismic restraints for heavy lab equipment, refrigerators, storage shelves, and file cabinets. With Donner Lab as a primary example, there does not appear to be a systematic approach by the Division for identifying earthquake hazards and assuring that seismic controls are in place.*

2005 MESH Concern: *Whereas "safety" at Potter Street and Building 55 is generally excellent, the state of safety at the Donner Laboratory appears to be poor. In addition to the seismic deficiencies described above, the laboratories at Donner had deficiencies in chemical inventory and storage, personal protective equipment, waste management, and radiation protection. Possibly more troubling was that the researchers interviewed by the MESH team did not appear to be fully aware of the poor safety conditions of their laboratories. It should be noted that two recent radiation contamination incidents occurred at Donner Lab. The list of observed unsafe or questionable practices omitted from this report.*

2005 MESH Concern: *The Division's self-assessment inspections of Donner Lab are not effective. In spite of numerous inspections this year by the Division, including a walkthrough by the Division Director, safety deficiencies are apparently not being noted. In general, many of the labs at Donner are in poor safety condition. Moreover, not one of the deficiencies identified by the MESH team is listed in LCATS.*

2007 Status: Following the 2005 MESH review, LSD designated an on-site building manager for Donner. In general, conditions at Donner appear to have improved and the on-site building manager can address seismic concerns more promptly. However, shortcomings in managing ES&H deficiencies persist: a walk-in refrigerator floor had structural damage resulting in a “pot hole,” unlabeled biological samples abandoned in place in a refrigerator, a grossly inappropriate computer workstation configuration, a CO₂ cylinder restrained with only one chain, and the entrance to the machine shop partially blocked by a cabinet.